On buying a pen, the shopkeeper gives three refills free. On buying a pen and six refills, the shopkeeper gives additional four refills free. If the equivalent discount is the same in both cases, then how many refills will be equal in value to a pen?

- 12
- 15
- 18
- 24

Video Explanation:

Explanation:

Let the cost of a pen be ‘p’ and that of a refill be ‘r’.

Then, $\frac{3r}{p} = \frac{4r}{p+6r}$ or $3rp + 18r^2 = 4rp$ which can be solved to find that $p = 18r$.

Hence, [3].

Alternatively,

We see that by adding 6 refills to a pen the value increase by 1/3rd (since the free refills go from 3 to 4) hence, $6r = \frac{p}{3}$ or $18r = 1p$.

Correct Answer:

Time taken by you: **24 secs**

Avg Time taken by all students: **135 secs**

Your Attempt: **Skipped**

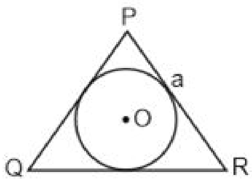
% Students got it correct: **86 %**

A jogging park has two tracks. A circular track is circumscribed by a triangular track such that the three vertices of triangle are equidistant from the centre of the circular track. A and B start jogging simultaneously from the same point where the circular and triangular tracks touch each other. A jogs along the circular track while B jogs along the triangular track. Approximately how much faster than A should B run, so that they take the same time to return to their starting points?

- 46%
- 160%
- 87%
- 60% ✔

Congratulations, you got it correct!

Explanation:



Let 'a' be the side of triangle.

P, Q, R are equidistant from O.

$\therefore$ ΔPQR is an equilateral triangle.

$\therefore$ Radius of the circular track = $\frac{a}{2\sqrt{3}}$

$\therefore$ Perimeter of $\Delta PQR = 3a$

Perimeter of the circular track = $2\pi \times \frac{a}{2\sqrt{3}} = \frac{\pi}{\sqrt{3}} a \approx 1.81\ a$

Now, as both of them should reach at same time

$\frac{\text{Speed of A } (S_A)}{} = \frac{\text{Speed of B } (S_B)}{}$

Correct Answer:

Time taken by you: **362 secs**

Avg Time taken by all students: **147 secs**

Your Attempt: **Correct**

% Students got it correct: **57 %**

Five consecutive positive integers a, b, c, d, e (in that order) exist such that $a^2 + b^2 + c^2 = d^2 + e^2$. Find the value of a + b + c + d + e.

Enter your response (as an integer) using the virtual keyboard in the box provided below.

60

Congratulations, you got it correct!

Explanation:

Let the numbers be $x - 2$, $x - 1$, x, $x + 1$ and $x + 2$. Then we have:

$x^2 - 4x + 4 + x^2 - 2x + 1 + x^2 = x^2 + 4x + 4 + x^2 + 2x + 1$

i.e., $x^2 - 12x = 0$

So $x = 0$ or 12.

Since we want positive integers, they will be 10, 11, 12, 13 and 14 and will add up to 60.

Therefore, the required answer is 60.

Correct Answer:

Time taken by you: **217 secs**

Avg Time taken by all students: **161 secs**

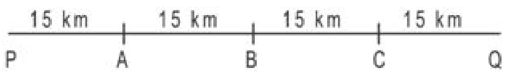
Your Attempt: **Correct**

% Students got it correct: **74 %**

Point P is 60 km away from point Q. Rajesh travels from point P to point Q at 120 kmph, immediately returns to P at 60 kmph and immediately goes back to Q at 30 kmph. Ramesh travels from point P to point Q at 30 kmph immediately returns to P at 60 kmph and immediately goes back to Q at 120 kmph. Both start from P at 10 AM. If they meet exactly at the midpoint of segment PQ for the second time, calculate the difference in the average speeds at which Ramesh and Rajesh travelled so far.

- 36 kmph
- 24 kmph
- 12 kmph
- 6 kmph

Explanation:



Time	Positions	
	Rajesh	Ramesh
10:30 AM	Q	A
11:00 AM	**B**	**B**
11:30 AM	P	C
12:00 noon	A	Q
12:30 PM	**B**	**B**

The two meet at B at 11:00 AM for the first time and again at B at 12:30 PM for the second time.

The distance covered by Rajesh till 12:30 PM = 60 + 60 + 30 = 150 km in 150 minutes

The distance covered by Ramesh till 12:30 PM = 60 + 30 = 90 km in 150 minutes.

Average speed of Rajesh $= \frac{150}{150} \times 60 = 60$ kmph

Average speed of Ramesh $= \frac{90}{[illegible]} \times 60 = 36$ kmph

Correct Answer:

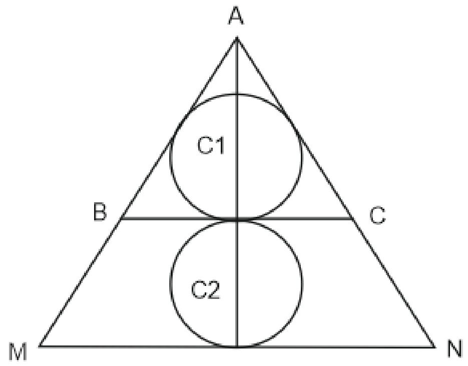
Time taken by you: **2 secs**

Avg Time taken by all students: **238 secs**

Your Attempt: **Skipped**

% Students got it correct: **68 %**

A circle C1 with radius ‘r’ is the incircle of equilateral triangle ABC of side 12 cm. Another circle C2 with same radius ‘r’ is drawn touching the circle C1 such that the line joining the centres of the two circles coincides with the altitude of ΔABC. Line segment MN is drawn such that it lies on the tangent to circle C2, which is parallel to side BC of ΔABC, as shown in the figure below. What is the area (in sq. cm) of the part of ΔAMN that lies outside the two circles?



- $(72\sqrt{3} - 24\pi)$
- $(100\sqrt{3} - 32\pi)$
- $(100\sqrt{3} - 24\pi)$ ✓
- $(72\sqrt{3} - 36\pi)$

Congratulations, you got it correct!

Explanation:

Circle C1 is the incircle of equilateral triangle ABC having side 12 cm.

$A(\Delta ABC) = \frac{\sqrt{3}}{4} \times 12^2 = 36\sqrt{3}$ sq. cm

Semiperimeter 's' of $\Delta ABC = \frac{12 + 12 + 12}{2} = 18$ cm

Therefore, radius of circle C1 = $\frac{36\sqrt{3}}{18} = 2\sqrt{3}$ cm

Also, the height of $\Delta ABC = \frac{\sqrt{3}}{2} \times 12 = 6\sqrt{3}$ cm
Now, $\Delta ABC \sim \Delta AMN$.
Therefore, the ratio of their corresponding sides = $\frac{\text{Height of } \Delta ABC}{\text{Height of } \Delta AMN} = \frac{6\sqrt{3}}{6\sqrt{3} + 4\sqrt{3}} = \frac{3}{5}$

Therefore, $\frac{A(\Delta ABC)}{A(\Delta AMN)} = \left(\frac{3}{5}\right)^2 = \frac{9}{25}$

Therefore, $A(\Delta AMN) = \frac{25}{9} \times 36\sqrt{3} = 100\sqrt{3}$ sq. cm

Therefore, the required answer = $100\sqrt{3} - 2 \times \pi(2\sqrt{3})^2 = (100\sqrt{3} - 24\pi)$ sq. cm

Correct Answer:

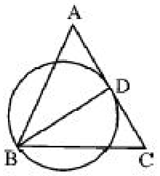
Time taken by you: **289 secs**

Avg Time taken by all students: **203 secs**

Your Attempt: **Correct**

% Students got it correct: **69 %**

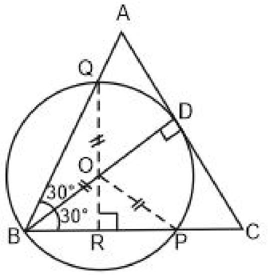
A circle is drawn such that its diameter coincides with the median BD of an equilateral triangle ABC of side $\frac{4}{\sqrt{3}}$ cm as shown.



Find the area of ΔABC that lies outside the circle.

- $\frac{2\sqrt{3}-\pi}{4}$ cm^2
- $\frac{3\sqrt{3}}{2}$ cm^2
- $\frac{5\sqrt{3}-2\pi}{6}$ cm^2
- $\frac{4\pi-\sqrt{3}}{2}$ cm^2

Explanation:



$A(\Delta ABC) = \frac{\sqrt{3}}{4} \times side^2 = \frac{4}{\sqrt{3}} cm^2$

$\ell(BD)$ = median of equilateral ΔABC

$= \frac{\sqrt{3}}{2} \times$ side of ΔABC

$= \frac{\sqrt{3}}{2} \times \frac{4}{\sqrt{3}} = 2$ cm

$\therefore$ The radius of the circle = 1 cm

$\therefore$ Area of the circle = π cm^2

Correct Answer:

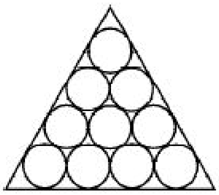
Time taken by you: **34 secs**

Avg Time taken by all students: **148 secs**

Your Attempt: **Skipped**

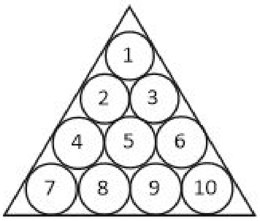
% Students got it correct: **51 %**

Ten balls of the same shape and size but having different colours are to be arranged into an equilateral triangular box as shown. Find the number of ways in which this arrangement can be done.



- 403200
- 201600
- 604800
- 1209600

Explanation:



We can select the ball at position 5 in 10 ways.

Then the balls at the corners can be selected in $^9C_3$ ways and can be arranged in 2 ways.

∴ Total number of arrangements possible = $10 \times (^9C_3 \times 2) \times 6! = 10 \times 84 \times 2 \times 6! = 1209600$.

Hence, [4].

Alterantively,

As the given triangle is equilateral, for every arrangement two more arrangements can be obtained just by rotation.

As ten balls to be arranged at 10 positions, the required answer = $\frac{10!}{3} = 1209600$

Correct Answer:

Time taken by you: **68 secs**

Avg Time taken by all students: **82 secs**

Your Attempt: **Skipped**

% Students got it correct: **46 %**

A car travelling at a speed of 80 km/hr requires 20% more petrol than when it travels at 60 km/hr for a certain distance. If the car can travel a distance of 20 km in one litre of petrol at 60 km/hr how much distance can it travel using 15 litres of petrol at 80 km/hr?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

km

Explanation:

Petrol required while travelling 20 km at 80 km/hr = 1.2 times while travelling 20 km at speed of 60 km/hr.

$\therefore$ Distance travelled using 15 litres of petrol = $\frac{15}{1.2} \times 20 = 250$ km.

Therefore, the required answer is 250.

Correct Answer:

Time taken by you: **388 secs**

Avg Time taken by all students: **126 secs**

Your Attempt: **Skipped**

% Students got it correct: **65 %**

The selection of candidates in a management entrance test is based on their performance in the interview and their marks in the written test. The marks in the written test is the simple average of the marks in Arithmetical Ability, Language Skills and the Logical Reasoning. The marks in the Language Skills is taken as the combined marks of Vocabulary with $\frac{2}{3}$ weight and of Reading Comprehension with $\frac{1}{3}$ weight. Consider the following data on marks obtained by Ajay and Vijay.

	Ajay	Vijay
(i) Arithmetical Ability	56	48
(ii) Language Skills		
Vocabulary	46.2	85.8
Reading Comprehension	58.5	99
(iii) Logical Reasoning	20	31.2

Find the performance in the written test of Vijay and the marks in Language Skills for Ajay.

- 56.47, 50.3
- 56.4, 52.3
- 51.3, 54.7
- 60.2, 58.5

Explanation:

Marks in Language Skills for Ajay

$= \left(\frac{2}{3} \times 46.2\right) + \left(\frac{1}{3} \times 58.5\right) = 30.8 + 19.5 = 50.3$

Performance in the written test for Vijay $= \frac{1}{3}\left[48 + \left(\frac{2}{3} \times 85.8\right) + \left(\frac{1}{3} \times 99\right) + 31.2\right]$

$= \frac{1}{3}[48 + 57.2 + 33 + 31.2] = \frac{169.4}{3} = 56.47$

Hence, [1].

Correct Answer:

Time taken by you: **6 secs**

Avg Time taken by all students: **187 secs**

Your Attempt: **Skipped**

% Students got it correct: **91 %**

Consider a set of 26 two-digit natural numbers a, b, c, … x, y, z in increasing order (i.e. a < b < c < … < x < y < z). If the average of the last 25 numbers exceeds that of all the 26 numbers by 1, what could be the maximum value of 'a'?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

1

Oops, you got it wrong!

Explanation:

The maximum possible values of ‘z’ is 99, similarly that for ‘y’ is 98 and so on. So the maximum possible value for ‘b’ would be 75. Accordingly, let us take b, c, ... y, z as 75, 76, ... 98, 99. Their average will be 87 and total will be 2175. Now the average of all 26 numbers should be 86 so their total should be 2236. Thus the maximum possible value of ‘a’ would be 2236 – 2175 = 61.

Therefore, the required answer is 61.

Alternatively;

The average of the last 25 numbers can be a maximum of 87. So if the average of all the 26 numbers is 86, the first 25 are contributing one average +1 to this new average (and a total of +25). So to balance that, the last number has to contribute −25 and must therefore be 86 − 25 = 61.

Correct Answer:

Time taken by you: **47 secs**

Avg Time taken by all students: **15 secs**

Your Attempt: **Wrong**

% Students got it correct: **7 %**

Sanjay has 35 pens and Mohan has 40 pens. These two, along with four other friends, collect their pens together. If Sanjay takes back his pens, the average number of pens with the rest of them is 20. What will be the average number of pens with the rest of them, if Mohan also takes back his pens?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

45

Oops, you got it wrong!

Explanation:

Let the total number of pens with the others be 'x', then $\frac{x+40}{5} = 20$

$\therefore x = 100 - 40 = 60$

$\therefore$ The average number of pens with the others $= \frac{x}{4} = \frac{60}{4} = 15$

Therefore, the required answer is 15.

Correct Answer:

Time taken by you: **71 secs**

Avg Time taken by all students: **76 secs**

Your Attempt: **Wrong**

% Students got it correct: **65 %**

Pipes P and Q are attached to a tank. Pipe P takes 12 minutes more than pipe Q to completely fill the tank which is empty. If the two pipes start filling the tank, it gets filled in 8 minutes. How many minutes does pipe P independently take to fill the tank?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

24

Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let pipe P takes 'x' minutes to fill the tank. Therefore, pipe Q takes $(x - 12)$ minutes to fill the tank.

As both the pipes together fill the tank in 8 minutes,

$$\frac{1}{x} + \frac{1}{x-12} = \frac{1}{8}$$

Solving this, we get $x = 4$ or 24. But x has to be more than 12 $\Rightarrow x = 24$

$\therefore$ Pipe P takes 24 minutes to fill the tank independently.

Therefore, the required answer is 24.

Correct Answer:

Time taken by you: **64 secs**

Avg Time taken by all students: **130 secs**

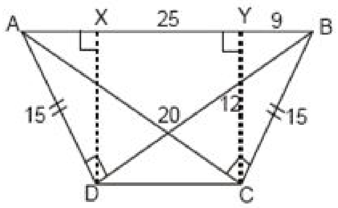
Your Attempt: **Correct**

% Students got it correct: **77 %**

In □ABCD, AB is parallel to CD. BD is perpendicular to AD and AC is perpendicular to BC. If AD = BC = 15 units and AB = 25 units, then the area of □ABCD is:

- 225 sq. units
- 192 sq. units
- 81 sq. units
- Cannot be determined

Explanation:



$AC = \sqrt{(25^2 - 15^2)} = 20$ units.

$A(\Delta ABC) = \frac{1}{2} \times AC \times BC = \frac{1}{2} \times AB \times CY$

$= \frac{1}{2} \times 20 \times 15 = \frac{1}{2} \times 25 \times CY$

$\therefore CY = 12$ units $\Rightarrow BY = 9$ units (Using Pythagoras theorem.)

Also, $AX = 9$ ($\because \Delta ADX \cong \Delta BCY$)

$\therefore DC = 25 - 2(9) = 7$

Correct Answer:

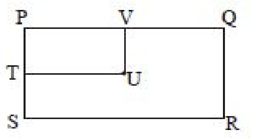
Time taken by you: **194 secs**

Avg Time taken by all students: **76 secs**

Your Attempt: **Skipped**

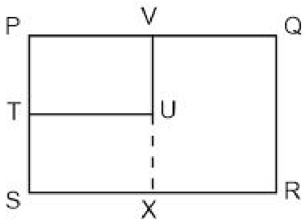
% Students got it correct: **29 %**

In the given figure, Sonu and Monu start moving from P and Q at speeds 5 m/s and 10 m/s respectively, in a clockwise direction at the same time. Sonu moves along the smaller rectangle ▫PVUT while Monu moves along the larger rectangle ▫QRSP. If T and V are midpoints of PS and PQ and PV = PS = 6 m, then at what distance from P will they meet?



- 3 m
- 1.5 m
- They will meet at point P.
- They will never meet.

Explanation:



We can observe that the speed of Monu is twice that of Sonu. Thus, at any given time, the distance traveled by Monu will be double the distance traveled by Sonu. When Sonu reaches point V, Monu reaches X and when Sonu reaches U, Monu reaches S. Now, when Sonu travels from U to T, Monu travels from S to V (without meeting Sonu). When Sonu reaches P, Monu reaches Q and this resembles their original position. This cycle repeats and thus they will never meet. Hence, [4].

Correct Answer:

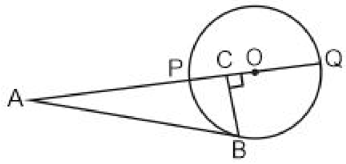
Time taken by you: **0 secs**

Avg Time taken by all students: **104 secs**

Your Attempt: **Skipped**

% Students got it correct: **42 %**

In the given figure, AB is tangent to the circle at B and C is the midpoint of radius OP of the circle.



$\ell(AB) = 10\sqrt{3}$ units and $\ell(AP) = 10$ units.

Find the area of ΔABQ.

- $\frac{75\sqrt{3}}{2}$ sq. units
- $75\sqrt{3}$ sq. units ✔
- $75\sqrt{2}$ sq. units
- 75 sq. units

Congratulations, you got it correct!

Explanation:

By Tangent Secant Theorem we have,

$AB^2 = AP \times AQ$

$\therefore \left(10\sqrt{3}\right)^2 = 10 \times \ell(AQ)$

$\therefore \ell(AQ) = \frac{300}{10} = 30$

$\ell(PQ) = \ell(AQ) - \ell(AP) = 30 - 10 = 20$

$\ell(PO) = \frac{1}{2}\ell(PQ) = \frac{1}{2} \times 20 = 10$

$\ell(PC) = \frac{1}{2}\ell(PO) = \frac{1}{2} \times 10 = 5$

$\ell(AC) = \ell(AP) + \ell(PC) = 10 + 5 = 15$

$\ell(BC) = \sqrt{[l(AB)]^2 - [l(AC)]^2} = \sqrt{(10\sqrt{3})^2 - (15)^2} = 5\sqrt{3}$

$A(\Delta AQB) = \frac{1}{2} \times AQ \times BC = \frac{1}{2} \times 30 \times 5\sqrt{3} = 75\sqrt{3}$ sq. units.

Correct Answer:

Time taken by you: **208 secs**

Avg Time taken by all students: **196 secs**

Your Attempt: **Correct**

% Students got it correct: **77 %**

A number is said to be a 'magic odd number' if it satisfies the following properties.

i. The only digits that form the number are 1, 3, 5, 7 or 9.
ii. No digit in the number exceeds its previous digit by 2.
iii. 1 does not follow 9.
iv. Repetition of the digits is permitted.

If we arrange all the magic odd numbers in ascending order, the 75^{th} number in the arrangement will be:

- 715
- 517
- 719
- 973

Explanation:

The number of one-digit magic odd number = 5

The number of two-digit magic odd numbers = 5 × 4 = 20

The number of three-digit magic odd numbers = 5 × 4 × 4 = 80

5 + 20 + 80 = 105 > 75

∴ The 75th magic odd number is a three-digit number.

The number of three-digit magic odd numbers with the hundreds digit as:

i. 1 is 4 × 4 = 16

ii. 3 is 4 × 4 = 16

iii. 5 is 4 × 4 = 16

∴ The largest three-digit magic odd number with the hundreds digit as 5 is a (5 + 20 + 16 + 16 + 16 =) 73rd number.

∴ The 75th magic odd number starts with 7 and is 715.

Hence, [1].

Correct Answer:

Time taken by you: **30 secs**

Avg Time taken by all students: **25 secs**

Your Attempt: **Skipped**

% Students got it correct: **20 %**

If $|a - 2| \leq 4$; $|b + 4| \leq 8$; $|2c - 3| \leq 11$, then find the difference between the maximum and minimum possible values of $(a + b + c)^2$.

- 35
- 324
- 289
- None of these ✖

Oops, you got it wrong!

Explanation:

$|a - 2| \leq 4 \Rightarrow -4 \leq (a - 2) \leq 4 \Rightarrow -2 \leq a \leq 6$

$|b + 4| \leq 8 \Rightarrow -8 \leq (b + 4) \leq 8 \Rightarrow -12 \leq b \leq 4$

$|2c - 3| \leq 11 \Rightarrow -11 \leq (2c - 3) \leq 11 \Rightarrow -4 \leq c \leq 7$

Now, $(a + b + c)^2$ is maximum when value of $|a + b + c|$ is maximum.

$|a + b + c| = |-2 - 12 - 4| = |-18| = 18$

$\therefore (a + b + c)^2 = 18^2 = 324$

And $(a + b + c)^2$ is minimum when $a + b + c = 0$ (one possible case is $a = b = c = 0$)

$\therefore (a + b + c)^2 = 0$

$\therefore$ Difference = 324 – 0 = 324. Hence, [2].

Correct Answer:

Time taken by you: **121 secs**

Avg Time taken by all students: **55 secs**

Your Attempt: **Wrong**

% Students got it correct: **34 %**

In a 300-yard race, A beat B by 60 yards. In the next race, which was of 400 yards, A gave B a head start of 100 yards. By what distance (in yards) did B win the latter race?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

25

Congratulations, you solved the question correctly and took less than average time!

Explanation:

In the first race, while A ran 300 yards, B ran 240 yards in the same time. Thus, the ratio of their speeds is 5 : 4. In the second race of 400 yards, B ran 300 yards (as he had a head start of 100 yards). In the same time, A would have run $300 \times \frac{5}{4} = 375$ yards.
Thus, he would still be 25 yards from the finish line.

Therefore, the required answer is 25.

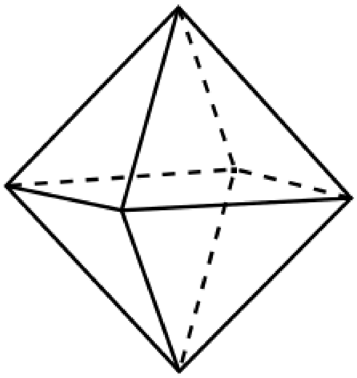
Correct Answer:

Time taken by you: **52 secs**

Avg Time taken by all students: **91 secs**

Your Attempt: **Correct**

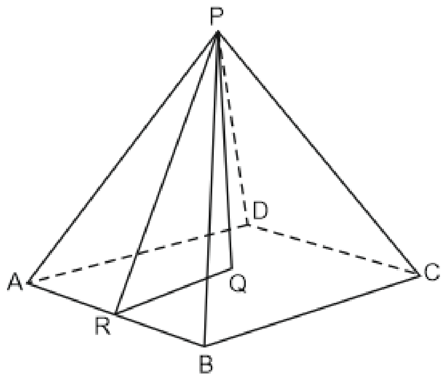
% Students got it correct: **63 %**



A regular octahedron is a solid figure with 8 faces, each of which is an equilateral triangle, as shown in the adjoining figure. Find the volume of a regular octahedron of side 1 cm.

- $\frac{\sqrt{3}}{2}$ cm^3
- $\frac{1}{\sqrt{3}}$ cm^3
- $\frac{\sqrt{2}}{3}$ cm^3
- $\frac{1}{3\sqrt{2}}$ cm^3

Explanation:



We can look at the regular octahedron as being made up of two square pyramids. Let us focus on one of these square pyramids, PABCD, as shown in the adjoining figure:

The base is a square of side 1, and the lateral surfaces are equilateral triangles of side 1. We need to find the height of the pyramid. Let's drop a perpendicular PQ from the upper vertex P to the base of the pyramid; Q will be the centre of square ABCD. Let R be the midpoint of AB. Then PQR will form a right

Correct Answer:

Time taken by you: **3 secs**

Avg Time taken by all students: **72 secs**

Your Attempt: **Skipped**

% Students got it correct: **51 %**

In a party, every girl shook hands with 3 boys and every boy shook hands with 2 girls. Also all the boys shook hands with each other but none of the girls shook hands with each other. In all there were 702 handshakes. How many girls and boys were there in all?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

Explanation:

Let the number of boys = b and number of girls = g

Every girl shook hands with 3 boys which amount to '3g' handshakes. But that's also equal to '2b' as every boy shook hands with 2 girls. So, 2b = 3g.

The number of boy-boy handshakes = ${}^{b}C_2 = \frac{b(b-1)}{2}$

So, total number of handshakes = $\frac{b(b-1)}{2} + 2b = 702 \Rightarrow b^2 + 3b = 1404 \Rightarrow b(b+3) = 1404$

Factoring 1404 into two factors with a difference of 3, we get 1404 = 36 × 39.

So, b = 36. So, g = 24. So total number = 60.

Therefore, the required answer is 60.

Correct Answer:

Time taken by you: **107 secs**

Avg Time taken by all students: **22 secs**

Your Attempt: **Skipped**

% Students got it correct: **11 %**

A sells two types of sugar with labels 'sugar cubes' and 'granulated sugar'. Both the sugars form a homogenous mixture when mixed. He sells 'sugar cubes' at Rs. 18 per kg and incurs a loss of 10% where as on selling 'granulated sugar' for Rs. 30 per kg, he gains 20%. How should he mix the dearer and cheaper sugar so as to achieve 25% profit by selling the mixture at Rs. 27.5 per kg?

- 1 : 2
- 2 : 1
- 2 : 3 ✔
- 3 : 2

Congratulations, you got it correct!

Explanation:

Cost of 'sugar cubes' $= \frac{100}{90} \times 18 =$ Rs. 20 per kg

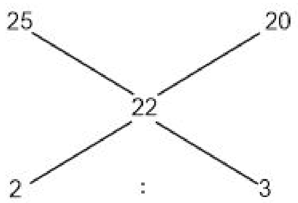
Cost of 'granulated sugar' $= \frac{100}{120} \times 30 =$ Rs. 25 per kg

Cost of the mixture $= \frac{100}{125} \times 27.5 =$ Rs.22 per kg

$\therefore$ Required ratio $= \frac{\text{Cost of mixture} - \text{Cost of cheper}}{\text{Cost of dearer} - \text{Cost of mixture}} = \frac{22-20}{25-22} = \frac{2}{3}$

Hence, [3].

Alternatively,



Correct Answer:

Time taken by you: **120 secs**

Avg Time taken by all students: **109 secs**

Your Attempt: **Correct**

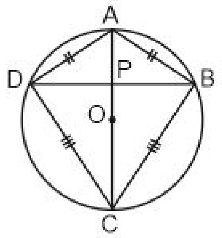
% Students got it correct: **60 %**

A kite-shaped quadrilateral is cut from a circular sheet of paper such that the vertices of the kite lie on the circumference of the circle. If the lengths of the sides of the kite are in the ratio 3 : 3 : 4 : 4, then approximately what percentage of the area of the circular sheet of paper remains after the kite has been cut out?

- 53%
- 47%
- 39%
- 42%

Congratulations, you solved the question correctly and took less than average time!

Explanation:



By symmetry, the longer diagonal AC of the kite is the diameter of the circular sheet.

The lengths of the sides of the kite are in the ratio 3 : 3 : 4 : 4.

Let AB = 3x, then BC = 4x

$\therefore$ A(□ABCD) $= 2 \times \frac{1}{2} \times AB \times BC = 3x \times 4x = 12x^2$

The area of the circular sheet $= \frac{22}{7} \times \frac{5x}{2} \times \frac{5x}{2} = \frac{275}{14}x^2$

$\therefore$ Area of the circle remaining after cutting the kite $= \frac{275}{14}x^2 - 12x^2 = \frac{107}{14}x^2$

$\therefore$ Required percent $= \frac{\frac{107}{14}x^2}{\ldots} \times 100$

Correct Answer:

Time taken by you: **58 secs**

Avg Time taken by all students: **132 secs**

Your Attempt: **Correct**

% Students got it correct: **79 %**

How many integers ‘x’ with $|x| < 100$ can be expressed as $x = \frac{4 - y^2}{4}$ for some integer ‘y’?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

11

Congratulations, you got it correct!

Explanation:

$x = \frac{4 - y^2}{4} \Rightarrow y^2 = 4(1 - x) \Rightarrow (1 - x) = \left(\frac{y}{2}\right)^2$

Note that $(1 - x)$ is a perfect square.

So, possible values of 'x' are 1, 0, −3, −8, −15, −24 ..., −99 corresponding to $\left(\frac{y}{2}\right)^2 = 0^2, 1^2, 2^2, ..., 10^2$.

So, 'x' can take 11 possible integer values.

Therefore, the required answer is 11.

Correct Answer:

Time taken by you: **136 secs**

Avg Time taken by all students: **28 secs**

Your Attempt: **Correct**

% Students got it correct: **16 %**

If ‘x’ is a positive real number such that; $x = 1 + \cfrac{1}{x + \cfrac{1}{1 + \cfrac{1}{x + \dots}}}$; then which of the following best describes the value of ‘x’?

- $2 < x < 2.5$
- $1.5 < x < 2$ ✖
- $1 < x < 1.5$
- $2.5 < x < 3$

Oops, you got it wrong!

Explanation:

$$x = 1 + \cfrac{1}{x + \cfrac{1}{1 + \cfrac{1}{x + \dots}}}$$

$$x = 1 + \cfrac{1}{x + \cfrac{1}{x}}$$

$$\therefore x = 1 + \frac{x}{x^2 + 1}$$

$$\therefore x = \frac{x^2 + 1 + x}{x^2 + 1}$$

$\therefore x^3 + x = x^2 + 1 + x$

$\therefore x^3 - x^2 - 1 = 0$ between $x = 1$ and $x = 2$

Now, at $x = 1.5$, $x^3 - x^2 - 1 = 3.375 - 2.25 - 1 = 0.125$

And, at $x = 1.2$

$x^3 - x^2 - 1 = 1.728 - 1.44 - 1 = -0.712$

Thus, $1 < x < 1.5$ best describes the value of 'x'.

Hence, [3].

Correct Answer:

Time taken by you: **132 secs**

Avg Time taken by all students: **106 secs**

Your Attempt: **Wrong**

% Students got it correct: **63 %**

If the product of two integers is −36, then which one of the following cannot be the sum of their squares?

- 97
- 328
- 153
- 450 ✓

Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let the two numbers be ‘a’ and ‘b’.

$\therefore ab = -36$

$(a \pm b)^2 = a^2 + b^2 \pm 2ab \Rightarrow (a \pm b)^2 = a^2 + b^2 \mp 72$

For $a^2 + b^2 = 97$, $(a + b)^2 = 97 - 72 = 25$, a square number.

For $a^2 + b^2 = 328$, $(a + b)^2 = 328 - 72 = 256$, a square number.

For $a^2 + b^2 = 153$, $(a + b)^2 = 153 - 72 = 81$, a square number.

For $a^2 + b^2 = 450$, $(a + b)^2 = 450 - 72 = 378$, not a square

Hence, [4].

Correct Answer:

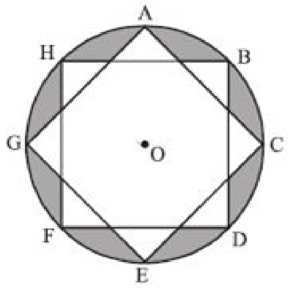
Time taken by you: **44 secs**

Avg Time taken by all students: **134 secs**

Your Attempt: **Correct**

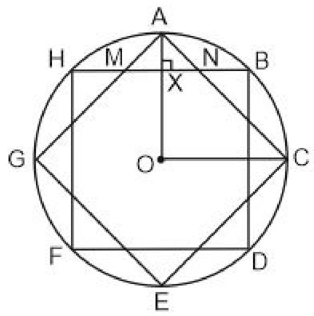
% Students got it correct: **92 %**

The points A, B, C, D, E, F, G and H divide the circumference of the circle with centre O and radius 1 cm into 8 equal parts. Find the area of the unshaded region.



- $(12 - 8\sqrt{2})$ sq.cm
- $(6 - 2\sqrt{2})$ sq.cm
- $(8 - 4\sqrt{2})$ sq.cm
- $(6\sqrt{2} - 4)$ sq.cm

Explanation:



□ACEG and □BDFH are congruent squares.

ΔBXO is a 45°-45°-90° triangle.

$\therefore \ell(OX) = \frac{\ell(OB)}{\sqrt{2}} = \frac{1}{\sqrt{2}}$ and $\ell(HB) = \sqrt{2}$

$\therefore A(\square HBDF) = [\ell(HB)]^2 = (\sqrt{2})^2 = 2$

$\ell(AX) = \ell(AO) - \ell(OX) = 1 - \frac{1}{\sqrt{2}}$

ΔAXN is also a 45°-45°-90° triangle.

Correct Answer:

Time taken by you: **43 secs**

Avg Time taken by all students: **112 secs**

Your Attempt: **Skipped**

% Students got it correct: **47 %**

What is the ratio of the area of a regular octagon to that of a regular hexagon, if both octagon and hexagon have been inscribed in a circle with radius ‘r’?

- Between 1 and 1.1
- Between 1.1 and 1.2
- More than 1.2
- More information is needed to answer the question

Explanation:

If we join all the vertices of the regular octagon with the center of the circle in which it is inscribed, we get in all 8 isosceles triangles with length of congruent sides = r and the angle formed at the center of the circle = $\frac{360}{8} = 45°$.

The area of the octagon = 8 × Area of each isosceles triangle.

Therefore, the area of the octagon = $8 \times \frac{1}{2} \times r \times r\sin 45 = 2\sqrt{2}\,r^2$

If we join all the vertices of the regular hexagon with the center of the circle in which it is inscribed, we get in all 6 equilateral triangles with length of congruent sides = r

The area of the hexagon = 6 × Area of each equilateral triangle.

Therefore, the area of the octagon = $6 \times \frac{\sqrt{3}}{4} r^2 = \frac{3\sqrt{3}}{2} r^2$

Therefore, the required ratio = $\frac{2\sqrt{2}\,r^2}{\frac{3\sqrt{3}\,r^2}{2}} = \frac{4\sqrt{2}}{3\sqrt{3}} \approx \frac{4 \times 1.41}{3 \times 1.73} \approx \frac{5.64}{5.19} \approx 1.09$

Hence, [1].

Correct Answer:

Time taken by you: **5 secs**

Avg Time taken by all students: **82 secs**

Your Attempt: **Skipped**

% Students got it correct: **46 %**

Rohan mixes a solution 'A' having water and oil in the ratio 3 : 4 with another solution 'B' having oil and turpentine in the ratio 5 : 6. How much solution 'A' and solution 'B' should he mix so that the amount of oil in the new mixture is 9 litres? (All values are integers)

- 11ℓ and 7ℓ
- 7ℓ and 11ℓ ✔
- 9ℓ and 9ℓ
- 9ℓ and 7ℓ

Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let 'x' litres of solution 'A' and 'y' litres of solution 'B' be mixed to get a solution containing 9 litres of oil.

$$\frac{4}{7}x + \frac{5}{11}y = 9$$

Since all values are integers 7 divides 'x' and 11 divides 'y'.

$\therefore$ x = 7 and y = 11. Hence, [2].

Alternatively,

7 litres of solution 'A' contains 4 litres of oil and 11 litres of solution 'B' contains 5 litres of oil.

$\therefore$ If he mixes 7 litres and 11 litres of the solutions respectively, the new solution will contain 9 litres of oil.

Correct Answer:

Time taken by you: **52 secs**

Avg Time taken by all students: **110 secs**

Your Attempt: **Correct**

% Students got it correct: **87 %**

$25\sqrt{7}\,(49\sqrt{5} + 7) = 5^x \cdot 7^y(7\sqrt{5} + 1)$. What can be the value of 'x' and 'y'?

- $2, \frac{3}{2}$
- $\frac{3}{2}, 1$ ✗
- $1, 2$
- $2, 1$

Oops, you got it wrong!

Explanation:

$25\sqrt{7}(7^2\sqrt{5}+7)$

$= 5^2 \times \sqrt{7} \times 7(7\sqrt{5} + 1)$

$= 5^2 \times 7^{\frac{3}{2}} (7\sqrt{5}+1)$

$\therefore$ x = 2 and y = $\frac{3}{2}$

Hence, [1].

Correct Answer:

Time taken by you: **118 secs**

Avg Time taken by all students: **109 secs**

Your Attempt: **Wrong**

% Students got it correct: **93 %**

‘x’ and ‘y’ are real numbers such that $y^2 \leq 7 + 6x - x^2$. Which of the following is the least possible value of ‘y’?

- $-\frac{1}{2}$
- 0 ✖
- −2
- −4

Oops, you got it wrong!

Explanation:

We have to find the least possible value of y such that $y^2 \leq 7 + 6x - x^2$

i.e., $y^2 \leq 16 - (x^2 - 6x + 9)$

$\Rightarrow y^2 \leq 16 - (x - 3)^2$

At x = 3, $(x - 3)^2 = 0$ or $y^2 \leq 16$

$\therefore\ -4 \leq y \leq 4$

$\therefore$ The minimum value of y = –4.

Hence, [4].

Correct Answer:

Time taken by you: **198 secs**

Avg Time taken by all students: **66 secs**

Your Attempt: **Wrong**

% Students got it correct: **52 %**

The number of ways in which one can put three balls numbered 1, 2 and 3 in three boxes labelled ‘a’, ‘b’ and ‘c’ such that, at the most one box is empty, is:

Enter your response (as an integer) using the virtual keyboard in the box provided below.

90

Oops, you got it wrong!

Explanation:

Case I: One ball in each box.

Number of ways to do this = $3 \times 2 \times 1 = 6$

Case II : Two balls in one box and one ball in another box.

Number of ways to do this = ${}^3C_2 \times 3 \times 2 = 18$

$\therefore$ Total number of ways = 6 + 18 = 24.

Therefore, the required answer is 24.

Alternatively,

Number of ways of putting 3 balls in 3 boxes = $3^3 = 27$

Number of ways putting 3 balls in one of the three boxes = 3

$\therefore$ The required number = 27 – 3 = 24.

Correct Answer:

Time taken by you: **47 secs**

Avg Time taken by all students: **31 secs**

Your Attempt: **Wrong**

% Students got it correct: **27 %**

In an arithmetic progression(AP); with not all terms equal to zero, the sum of the first ‘x’ consecutive terms is equal to the sum of the first ‘y’ consecutive terms, x > y. If the sum of the first ‘n’ terms is zero, then ‘n’ can be:

- $x - y$
- $\frac{x-y}{2}$
- $\frac{x+y}{2}$
- $x + y$ ✓

Congratulations, you solved the question correctly and took less than average time!

Explanation:

Let 'a' be the first term and 'd' be the common difference of the AP

The sum of the first 'x' terms of the AP, $S_x = \frac{x}{2}[2a + (x-1)d]$

The sum of the first 'y' terms of the AP, $S_y = \frac{y}{2}[2a + (y-1)d]$

But $S_x = S_y$ (given)

$\therefore \frac{x}{2}[2a + (x-1)d] = \frac{y}{2}[2a + (y-1)d]$

$\therefore 2ax + x^2d - xd = 2ay + y^2d - yd$

$\therefore 2a(x-y) - d(x-y) + d(x^2 - y^2) = 0$

$\therefore (2a-d)(x-y) + d(x+y)(x-y) = 0$

Since, $x > y$, $(x-y) \neq 0$

$\therefore 2a + (x+y-1)d = 0$ ...(i)

The sum of the first $(x+y)$ terms is

Correct Answer:

Time taken by you: **35 secs**

Avg Time taken by all students: **82 secs**

Your Attempt: **Correct**

% Students got it correct: **57 %**

Two creepers, one Virginia and the other Wisteria, are both climbing up and round a cylindrical tree trunk. Virginia twists clockwise and Wisteria anticlockwise, both start at the same point on the ground. Before they reach the first branch of the tree the Virginia had made exactly 4 complete twists and the Wisteria exactly 7 twists. Not counting the bottom and the top, how many times do they cross?

Enter your response (as an integer) using the virtual keyboard in the box provided below.

28

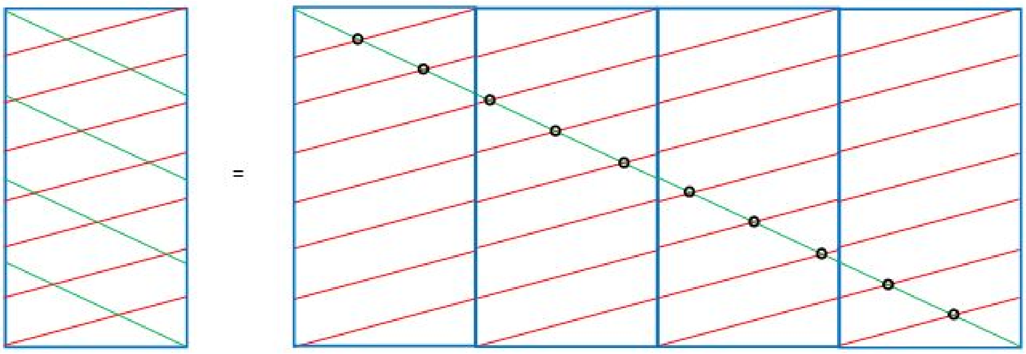
Oops, you got it wrong!

Explanation:

We can see that this is equivalent to two people starting from the same point and running around a circular track in opposite directions. Since one completes 4 rounds and the other 7, they will have met 11 times (including the final meeting) when they meet again at the start. Since we are not counting the bottom and the top, they will cross 10 times in the interim.

Therefore, the required answer is 10.

A more visual solution (but obviously not efficient from an exam point of view) could be:



Correct Answer:

Time taken by you: **48 secs**

Avg Time taken by all students: **10 secs**

Your Attempt: **Wrong**

% Students got it correct: **10 %**

If $|\log_{(x-1)}(x + 1)| = 2$, then how many real values of ‘x’ satisfy the given equation?

- 2
- 3 ✖
- 4
- 5

Oops, you got it wrong!

Explanation:

$\log_{(x-1)}(x+1) = 2$ or $\log_{(x-1)}(x+1) = -2$

$\log_{(x-1)}(x+1) = 2 \Rightarrow (x+1) = (x-1)^2 \Rightarrow x^2 - 3x = 0 \Rightarrow x = 3$ or 0

$\log_{(x-1)}(x+1) = -2 \Rightarrow (x+1) = (x-1)^{-2} \Rightarrow (x+1)(x-1)^2 = 1$

$x^3 - x^2 - x = 0$ Or $x = 0$ or $\frac{1 \pm \sqrt{5}}{2}$

$\therefore\ x = 0, 3, \frac{1+\sqrt{5}}{2}, \frac{1-\sqrt{5}}{2}$

But for $x = 0$ or $\frac{1-\sqrt{5}}{2}$, $(x-1) < 0$

Therefore, for $x = 3$ and $\frac{1+\sqrt{5}}{2}$ satisfy the given equation.

Hence, [1].

Correct Answer:

Time taken by you: **45 secs**

Avg Time taken by all students: **142 secs**

Your Attempt: **Wrong**

% Students got it correct: **71 %**